

Report Summary: The Costs and Financial Benefits of Green Buildings

New Study Shows Green Buildings are Highly Cost Effective

Green Buildings: Good Business

Green buildings are cost-effective and make good business sense, according to a study issued in October 2003 for 40 California state agencies. The study, by the Capital E group, Lawrence Berkley Laboratory and participating agencies, is the most definitive cost-benefit analysis of green building ever conducted.

The California Sustainable Task Force funded the study to help guide its work implementing executive orders that required the state to implement sustainable building practices and lease space that was energy efficient and environmentally sensitive, in a cost-effective manner. With this study, the California Department of Finance has signed off on the existence of financial benefits associated with improved health productivity and lowered operations and maintenance costs in green buildings.

Green Buildings Address State's Challenges

Green buildings provide a potentially promising way to help address a range of challenges:

- High cost of electric power;
- Worsening electric grid constraints, with associated power quality and availability problems;
- Pending water shortage and waste disposal issues;
- Continued state and federal pressure to cut criteria pollutants;
- Growing concern over the cost of global warming;
- The rising incidence of allergies and asthmas, especially in children;
- The health and productivity of workers;
- The effect of the physical school environment on children's abilities to learn;
- Increasing expenses of maintaining and operating state facilities over time

Green Building Premium: 2% Average

The study analyzed 33 buildings in 12 states that achieved or are near achieving the US Green Building Council's LEED™ certification. The average premium for these green buildings is slightly less than 2%, substantially lower than is commonly perceived. Assuming conservative, relatively high California commercial construction costs of \$150/ft² to \$250/ft² a 2% premium is equivalent to \$3 to \$5/ft².

Level of Green Standard	No. of Bldgs	Average Green Cost Premium
Level 1 - Certified	8	0.66%
Level 2 - Silver	18	2.11%
Level 3 - Gold	6	1.82%
Level 4 - Platinum	1	6.50%
Average	33	1.84%

Source: USGBC, Capital E Analysis

Measured Learning and Productivity Improvements

Earlier studies document measurable benefits for enhanced daylighting, natural ventilation, and improved indoor air quality in buildings. Benefits associated with these "green" features include enhanced worker and student productivity, as well as reduced absenteeism and illness.

- Heshong-Mahone Group study looked at student performance in 3 cities and found that students in classrooms with the greatest amount of daylighting performed up to 20% better than those in classrooms that had little daylight.
- A study at Herman-Miller showed up to a 7% increase in worker productivity following a move to a green, daylight facility.
- A Lawrence Berkeley National Laboratory study found that indoor air quality improvements could save U.S. businesses as much as \$58 billion in lost sick time and an additional \$200 billion in worker performance.

10 to 1 Benefit to Cost Ratio

The report concluded that financial benefits of green design are between \$48 and \$75 per square foot in a LEED building, over 10 times the additional cost associated with building green. The financial benefits were found to be in lower energy, waste and water costs, lower environmental and emissions costs, and lower operational and maintenance costs and increased productivity and health.

Financial Benefit Category	20-year NPV	
	Certified and Silver	Gold and Platinum
Energy Value	5.79	5.79
Water Value	0.51	0.51
Waste Value (construction only, 1 year)	0.03	0.03
Emissions Value	1.18	1.18
Commissioning O&M Value	8.47	8.47
Productivity and Health Value	36.89	55.33
20-year NPV Benefits	52.87	71.31
Less Green Cost Premium	(4.00)	(4.00)
Total 20-year NPV	48.87	75.31

Source: USGBC, Capital E Analysis

Even without taking credit for the harder to measure benefits of emissions, commissioning, productivity and health, the benefit to cost ratio is favorable. The energy, water and waste values alone total over \$6 per square foot, compared to the \$4 green cost premium.

Source:

The Costs and Financial Benefits of Green Buildings: A Report to California's Sustainable Building Task Force (October 2003), Capital E, Department of Health Services, Lawrence Berkeley Laboratory, available for free at <http://www.usgbc.org/Docs/News/News477.pdf>